

REMARKS

Applicants thank the Examiner for the thorough consideration given the present application. Claims 1-7, 9 and 10 are currently being prosecuted. The Examiner is respectfully requested to reconsider his rejections in view of the Amendments and Remarks as set forth hereinbelow.

CLAIM FOR PRIORITY

It is gratefully acknowledged that the Examiner has recognized the Applicant's claim for foreign priority. In view of the fact that the Applicant's claim for foreign priority has been perfected, no additional action is required from the Applicants at this time.

DRAWINGS

As set forth on the PTO-948 attached to the Examiner's Office Action, the Official Draftsperson has approved the Formal Drawings submitted by the Applicants. No further action is believed to be necessary at this time.

ACKNOWLEDGEMENT OF INFORMATION DISCLOSURE STATEMENT

The Examiner has acknowledged the Information Disclosure Statement filed on March 9, 2000. An initialed copy of the PTO-1449 has been received from the Examiner. No further action is necessary at this time.

REJECTION UNDER 35 USC 102

Claims 1-8 stand rejected under 35 USC 102 as being anticipated by Nakao et al, U.S. 5,651,072. This rejection is respectfully traversed.

At the outset, claim 8 has been cancelled. Claims 1, 6 and 7 have been amended. It is respectfully submitted that claims 1-7 are not anticipated by the prior art cited by the Examiner. As set forth in Section 2131 of the MPEP Original Eighth Edition, August, 2001, page 2100-68:

“A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. V. Union Oil Co. Of California*, 814 F2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). “The identical invention must be shown in as complete detail as is contained in the ... claims.” *Richardson v. Suzuki Motor Co.*, 868 F2d 1226, 1236, 9 USQP2d 1913, 1920 (Fed. Cir. 1989).

The present invention is directed to an active noise control circuit for a passenger compartment of a vehicle wherein a canceling sound generating means is disposed in the passenger compartment and a microphone is provided for generating an output signal as a reference signal. As set forth in claim 1, a combination of elements are provided wherein a microphone is disposed at an antinode of an acoustic normal mode of the passenger compartment, for generating an output signal as the reference signal.

Claim 1 has been amended to set forth a combination of elements wherein the microphone for generating a reference signal is disposed centrally in the width direction of

the vehicle. This feature of the present invention is clearly illustrated in Fig. 19 wherein the microphones 46a, 46b and 45 are disposed centrally in a width direction of the vehicle. In accordance with this feature, because the reference signal microphone is disposed at a distance from the windows of the vehicle, it is difficult for outside noises, for example during opening and closing of the windows, to be received by the microphone. Thus, in contrast to Nakao et al. ('072), it is unnecessary to provide any structure for recalibrating sensitivity and selecting a microphone.

By contrast, the Nakao et al. patent is directed to a vibration reducing apparatus for canceling out engine noise (booming), wherein microphones 7-1 to 7-L are disposed inside the vehicle compartment to serve as a vibration sensor. The microphones would correspond to the "noise cancellation confirming microphones" of the present invention. When, as in the Nakao et al. patent, a large number of cancellation confirming microphones are used, for example when selecting which microphone is to be used, the LMS calculation load becomes excessively large. Further, a control means for selecting a microphone to be used is essential in the Nakao et al. patent. The effect of such a control means, as shown in Figures 8 and 9 of the Nakao et al. patent, is for canceling resonance inside of the vehicle compartment based on a reference signal from the engine, and thus such a control is clearly different from that used in the claimed invention.

Furthermore, according to the presently claimed invention a combination of elements are provided wherein a microphone is positioned at an acoustic antinode, having an object of reducing resonance in the passenger compartment, there is no need to have unneeded

components which are not actively working. By contrast, in Nakao et al. patent a signal from the engine is referenced, and in order to monitor the noise cancellation state inside of the passenger compartment, which varies moment to moment, a microphone which resides in a region where noise is maximally generated must be selected from among the plurality of separately disposed microphones. In contradistinction thereto, the claimed invention provides a combination of elements wherein a single microphone is positively positioned at the acoustic antinode.

For the foregoing reasons, the features of amended claim 1 are not shown or suggested by the cited prior art. Dependent claim 2 is allowable at least for the same reasons as amended claim 1.

With regard to claim 3, a combination of elements are set forth wherein a "a plurality of microphones for confirming cancellation of the noise in the passenger compartment" are "positioned respectively near the laterally spaced roof rails of the vehicle in confronting relation to the ears of occupants seated in the passenger compartment." Since these features are not shown in the Nakao et al. patent, it is respectfully submitted that amendments are not needed to claim 3 to patentably distinguish over the cited prior art.

By installing the microphones at fixed positions on left and right roof rails, the relative position between the speaker 25 and the microphones 43, 44 is made constant and a transfer function therebetween is not altered due to changes in the positioning of the front passenger seats.

The transfer characteristic with respect to the passenger compartment noise, which reaches a position near the roof rails 30A, 30B in confronting relation to the ears of the occupants in the front seats from the speaker 25, is in a predetermined frequency range. Therefore, the present invention is in agreement with almost all frequencies. Further, a similar feature is also true in the level of sonic pressure. Stated otherwise, when the microphones for confirming cancellation of vehicle compartment noise are installed respectively near the laterally spaced roof rails of the vehicle in confronting relation to the ears of occupants seated in the passenger compartment, a similar acoustic condition to that actually occurring in the vicinity of the occupants ears can be faithfully reproduced, whereby noises can be more effectively reduced.

Further, because the positioning of the passenger's head is imposed between the microphones, which are disposed along the laterally spaced roof rails, a wider noise-canceling region is expanded toward the height of the passenger's head.

The above combination of features and limitations of claim 3 are not disclosed in Nakao et al. patent. There is no discussion in the Nakao et al. patent of disposing any elements near the laterally spaced roof rails of the vehicle. Moreover, there is no indication of the actual positioning of the microphones M10 and M9 in Fig. 15, which have been highlighted by the Examiner. Based on the drawing, it appears that M10 and M9 are attached to the instrument panel. However, this is clearly a separated distance from the microphones M1-M4 that are installed on the headrests of the front passenger seats. Such a feature is by no means responsive to the limitation of claim 3, wherein a combination of elements are

provided that include a plurality of microphones positioned respectively near the laterally spaced roof rails of the vehicle in confronting relation to the ears of occupants seated in the passenger compartment. Moreover, such an arrangement cannot achieve the operation and effect of the claimed invention.

Claim 4 is directed to a combination of elements wherein "a microphone for confirming cancellation of noise in the passenger compartment," is provided wherein the microphone is "positioned substantially centrally between laterally spaced roof rails of the vehicle in confronting relationship to the ear of an occupant seated in the passenger compartment."

Thus, similar to claim 3, by installing the microphone in a fixed position centrally between laterally spaced roof rails, a relative distance between the speaker 25 and the microphone 43, 44 is fixed, so that the transfer function is not altered due to changes in the positioning of the front passenger seats as occurs in conventional systems.

Further, the effect of the claimed structure is that by positioning the microphone centrally, so as to be distanced from the window side, it is closer to the sonic pressure site of the occupant's ear, so that a more effective sound cancellation effect can be achieved.

By contrast, the Nakao et al. patent has no disclosure or suggestion of the above features. The microphones M3 and M2 shown in Fig. 5 and indicated by the Examiner are no different from the conventional method of disposing microphones on a headrest wherein as the relative distance between the speaker and the noise cancellation confirming microphone changes as the passenger seats move forward and backward the noise cancellation cannot be

sufficiently achieved. Further, the operation and effect of the claimed invention is not mentioned in the Nakao et al. patent. Therefore, the claimed invention is novel and obvious over the cited prior art.

In addition to the arguments above with respect to claim 3, according to claim 5, a microphone is further disposed near a central console in the passenger compartment, which is effective for noise cancellation at the face. In the Nakao et al. patent there is no mention of the structure or operational effects of the claimed invention. Further, naturally, claim 4 is allowable as a dependent claim for the same reasons as claim 3.

Claim 6 has been amended recite a combination of elements wherein a reference signal microphone for generating a reference signal is disposed centrally in the width direction of the vehicle. Therefore, the claimed structure provides a similar effect to that discussed above for claim 4. There is no disclosure or suggestion of this feature in the Nakao et al. patent.

Claim 7 has been amended to include the subject matter set forth in dependent claim 9, wherein the microphone and the feedback control circuit are housed in a storage box. Further, with respect to the control circuit, the claim has been amended to set forth a combination of elements wherein the control circuit comprises an adjusting circuit for adjusting amplitude and phase that is provided between a canceling sound generating means and the microphone, based on a transfer characteristic from the microphone.

As a result of the above features, the speaker, which acts as the canceling noise generating means, can be attached separately from the storage box. Since the microphone

and control circuit are commonly disposed in the same storage box, with a large scale speaker disposed separately therefrom, the storage box can be installed in a limited space, for example, underneath the seat. In other words, a large speaker, which does not need to be placed at the noise antinode may be made separate, and a microphone, which necessarily should be placed at the noise antinode is kept small and compact, so that it can be installed in a small installation space at the noise antinode, permitting its use in a limited space. Further, by keeping the speaker separated, a conventional audio type speaker can be used. In this case, the adjusting circuit has a transfer characteristic between the canceling noise generating means and the microphone.

However, in the Nakao et al. patent, although it may be shown that a vibration sensor (microphone) may be disposed beneath the seat, if such microphone is simply a single piece, clearly it could be disposed in any of various locations.

Of course, claim 7 is also allowable as a dependent claim, for the same reasons as claim 6, discussed above.

It is respectfully submitted that the prior art cited by the Examiner does not set forth each and every element as defined in the claims. Thus, the Examiner's rejection based on 35 USC 102 has been obviated.

REJECTION UNDER 35 USC 103

Claims 9 and 10 stand rejected under 35 USC 103 as being unpatentable over Nakao et al in view of Mason et al., U.S. 5,410,607. This rejection is respectfully traversed.

The Mason et al. patent may disclosed that a sensor (microphone) and circuit are accommodated in a storage box. However, the speaker is also disposed in the same storage box. Therefore, it would be difficult or impossible to use a limited space within the vehicle compartment as an installation location. It is also possible that the noise canceling sound would not be effectively outputted. Thus, the structure and operational effect of the claimed invention, wherein a combination of elements are provided with speaker separated from the storage box, is not shown or suggested by the Mason et al. patent even when considered in combination with the Nakao et al patent.

Since the combination of features set forth in claim 9, pertaining to the microphone and feedback control circuit disposed in the same storage box have been incorporated into claim 7, claim 9 has now been amended to depend from claim 7 for reciting remaining features, i.e., that the storage box is disposed beneath the front seat in the passenger compartment. Thus, claim 9 is allowable, as a dependent claim, basically for the same reasons discussed above with respect to claim 7.

Claim 10 has been amended to depend from claim 7 and is allowable for the same reasons discussed above.

Applicant respectfully submits that when one recognizes that a problem exists in the prior art, and thereafter, solves that problem, that the Applicant is entitled to a patent when the prior art fails to teach or suggest the solution thereof.

For example, as stated by Judge Johnson in In re Shaffer, 108 USPQ 326 (CCPA 1956):

"It is too well settled for citation that references may be combined for the

purpose of showing that a claim is unpatentable. However, they may not be combined indiscriminately, and to determine whether the combination of references is proper, the following criterion is often used: namely, whether the prior art suggests doing what an applicant has done ... (citation of cases) Furthermore, when references are combined to negate patentability, it should also be considered whether one skilled in the art with the references before him could have made the combination of elements claimed without the exercise of invention ... (citation of cases) The foregoing cases, in our opinion, stand for the proposition that it is not enough for a valid rejection to view the prior art in retrospect once an applicant's disclosure is known. The art applied should be viewed by itself to see if it fairly disclosed doing what an applicant has done. If the art did not do so, the references may have been improperly combined."

It is respectfully submitted that a rejection under 35 U.S.C. § 103 is not proper unless the prior art provides a teaching for combining the references so as to render obvious the subject matter set forth in the claims. As set forth in Diversitech Corp. v. Century Steps, Inc., 7 USPQ2d 1315 (Fed. Cir. 1988) the Court stated:

"The problem confronted by the Inventor must be considered in determining whether it would have been obvious to combine references in order to solve that problem"

In the specific situation presented to the Examiner, the Examiner acknowledges that the Nakao et al. patent fails to disclose a storage box. The disclosure set forth in the Mason et al. patent does not overcome the deficiencies of the Nakao et al. patent. There is no teaching or motivation to modify the configuration

NO PROSECUTION HISTORY ESTOPPEL

Claims 1, 6 and 7 have only been amended to clarify the subject matter being claimed. No prosecution history estoppel would apply to the interpretation of the limitations

set forth in claims 1-7, 9 and 10 in view of the fact that this subject matter has been continuously presented since the original filing date of the present application.

CONCLUSION

In view of the above remarks, it is believed that the claims clearly distinguish over the patents relied on by the Examiner, either alone or in combination.

Since the remaining patents cited by the Examiner have not been utilized to reject the claims, but to merely show the state of the art, no comment need be made with respect thereto.

In view of the above amendments and remarks, reconsideration of the rejections and allowance of all of the claims are respectfully requested.

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding rejections and that they be withdrawn. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance.


If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (703) 205-8000 in the Washington, D.C. area.

A prompt and favorable consideration of this Amendment is respectfully requested.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By: 
James M. Slattery
Reg. No. 28,380

JMS/mmi

P.O. Box 747
Falls Church, VA 22040-0747
(703) 205-8000